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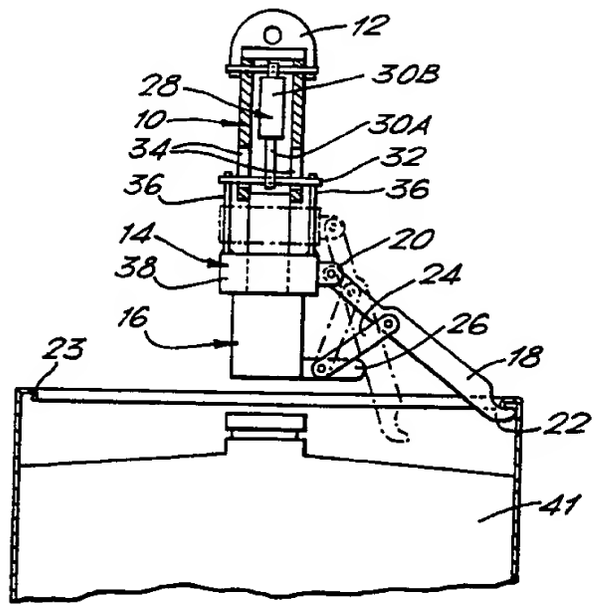

(57) Abstract

A lifting attachment comprises a columnar body (10) having anchorage means (12) at its top to be connected to a lifting apparatus. First and second mounting means (14, 16) are provided on the body (10) in vertical spaced relation. One of said mounting means (14 or 16) is adapted to be moved towards and away from the other of said mounting means (16 or 14) which is stationary. A series of gripping mechanisms each includes a radiating arm (18) pivotally attached at its inner end to a respective mounting on one of said mounting means (14 or 16). The arms (18) are similarly shaped at their outer ends each as a gripping finger (22). Each arm (18) is in a pivotal relationship with a corresponding mounting on the other of said mounting means (16 or 14). Movement of one of said mounting means relative to the other of said mounting means causes the arms (18) to splay apart from the body (10) into a gripping position. Means is provided to move one of the mounting means. An assembly is provided to support a plurality of lifting attachments.

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LIFTING ATTACHMENT

This invention relates to a lifting attachment for use with lifting apparatus in lifting and handling loads having an upstanding collar, normally substantially cylindrical in shape, with a grippable member along its top edge, such loads being, for example one or more drinks kegs or barrels.

Accordingly, a first aspect of the present invention is a lifting attachment comprising a columnar body having anchorage means at its top to be connected to a lifting apparatus, first and second mounting means being provided on the body in vertical spaced relation, one of said mounting means being adapted to be moved towards and away from the other of said mounting means which is stationery, and a series of gripping mechanisms each including a radiating arm pivotally attached at its inner end to a respective mounting on one of said mounting means, the arms being similarly shaped at their outer ends each as a gripping finger, each arm being in a pivotal relationship with a corresponding mounting on the other of said mounting means, movement of one of said mounting means relative to the other of said mounting means causing the arms to splay apart from the body into a gripping position, and means to move one of the mounting means.

Preferably, the body is a casing in which the

moving means is housed. The moving means is desirably a piston and cylinder arrangement with the outer end of the piston arranged to extend and retract below the cylinder. A yoke bar is preferably mounted to the outer end of the piston with its two opposite ends to extend out through respective diametrically opposed slots in the casing. The bar at each end desirably carries a rod secured at its outer end to a sleeve peripherally around the casing. The sleeve desirably has three equi-spaced radial mountings extending therefrom.

Preferably, also the sleeve forms the one of said mounting means which is the first mounting means to which the arms are pivotally attached. Each arm is linked by a tie pivotally attached at its opposite ends to the arm and to the corresponding mounting on the other of said mounting means which is the second mounting means. The second mounting means preferably comprises three radial mountings spaced apart similarly to the mountings of the first mounting means.

Alternatively, the arms are pivotally attached to the first mounting means and each arm is in sliding engagement in a tube pivoted to the second mounting means formed by a base plate.

In a further alternative, the one of said mounting means may be the second mounting means to which the arms are pivotally attached and the corresponding ties are

pivotally attached at their opposite ends to the arm and to corresponding mountings on the other of said mounting means which is the first mounting means.

Preferably further, the anchorage means is an apertured plate uprightly oriented on the top of the casing.

According to a second aspect of the present invention, an assembly of lifting attachments is provided comprising a substantially horizontal planar frame having anchorage means proud of its upper surface and supporting a plurality of lifting attachments as described in the six next preceding paragraphs extending therebelow, movement of the moving means of all attachments being synchronised. The frame is preferably rectangular and six lifting attachments are supported therefrom in an arrangement of three pairs of two attachments.

Alternatively, the assembly may comprise a main body having first and second mounting means for mounting four lifting attachments, each arm being pivoted to first mounting means and in sliding engagement in a tube pivoted to the second mounting means, the outer ends of the arms each being adapted for supporting a lifting attachment.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a side view of a lifting attachment according to a first embodiment of the present invention and showing only one lifting mechanism;

Fig. 2 is a plan view of the attachment shown in Fig. 1;

Fig. 3 is a side view of part of a lifting attachment according to a second embodiment showing only one lifting mechanism;

Fig. 4 is a side view of part of a lifting attachment according to a third embodiment showing only one lifting mechanism;

Fig. 5 is a plan view of an assembly of lifting attachments according to one embodiment;

Fig. 6 is a plan view of a main body of an assembly of attachments according to an other embodiment; and

Fig. 7 is a side view of the main body of the assembly shown in Fig. 6 showing only one lifting mechanism.

Referring to the drawings, a lifting attachment comprises a columnar body 10 having anchorage means 12 at its top to be connected to a lifting apparatus. First and second mounting means 14, 16 are provided on the body 10 in vertical spaced relation. One of the mounting means is adapted to be moved towards and away from the other of the mounting means. A series of gripping

mechanisms each including a radiating arm 18 pivotally attached at its inner end to a respective mounting 20 on one of the mounting means, the arms 18 are similarly shaped at their outer ends each as a gripping finger 22. Movement of one of the mounting means downwardly towards the other of the mounting means causes the arms 18 to splay apart from the body 10 into a gripping position as shown in Figs. 1 and 3 with an inboard position being shown in broken line and the reverse being shown in Fig. 4.

Means is provided to move one of mounting means. The body 10 is a casing in which is housed the moving means comprising a piston and cylinder arrangement 28 with the outer end of the piston 30A arranged to extend and retract below the cylinder 30B. A yoke bar 32 is mounted to the outer end of the piston 30A with its two opposite ends to extend out through respective diametrically opposed slots 34 in the body 10. The bar 32 at each end carries a rod 36 secured at its outer end to a sleeve 38 in peripherical sliding engagement around the body 10. The sleeve 38 has three equi-spaced radial mountings 20 extending therefrom.

The anchorage means 12 is an apertured plate uprightly oriented on the top of the body 10.

In a first embodiment of the lifting attachment as shown in Figs. 1 and 2, the sleeve 38 constitutes the one of said mounting means which is the first mounting

means 14 and the other of said mounting means is th second mounting means 16. The second mounting means 16 comprises three radial mountings 26 spaced apart similarly to the mountings 20 of the first mounting means 14. Each arm 18 is linked by a tie 24 pivotally attached at its opposite ends to the respective arm 18 and to a corresponding mounting 26 on the second mounting means 16.

In use, the attachment is connected to a lifting apparatus with the arrangment 28 communicating with a hydraulic fluid supply. The attachment is lowered onto a key 41 to be lifted and the piston 30A is extended for the fingers 22 to grip under an inturned gripable member of said key 41 and so allow the key 41 to be lifted and manoeuvred as required. The fingers 22 are removed with retraction of the piston 30Acausing corresponding raised movement of the sleeve 38 with the gripping mechanism being shown in broken line.

In a second embodiment as shown in Fig. 3 in which like parts are denoted by like numerals, the second mounting means 16 is a base plate 44 and the gripping mechanisms include three tubes 46 each pivoted to the base plate 44. The arms 18 are each in sliding engagement in a respective tube 46. The arms 18 are pivoted through a link 45 to the sleeve 38.

In use, movement of the sleeve 38 downwards causes

the arms 18 to splay apart and engage the grippable member as shown in full line, and upward movement causes the arms 18 to withdraw from engagement as shown in broken line.

In a third embodiment as shown in Fig. 4 in which like parts are denoted by like numerals, the one of the mounting means to which the arms 18 are pivoted is the second mounting means 16 and the ties 24 are pivotally attached to the other of the mounting means which is the first mounting means 14 in the fortm of an annular flange 48 whose periphery extends beyond the pivotal connections between the arms 18 and their respective mounting 50.

In use, upward movement of the first mounting means 14 causes the arms 18 to engage a grippable member 23 whereas downward movement of the first mounting means 14 causes the arms 18 to disengage.

In each of the three embodiments, means to lock the arms in an engaged gripping position can be provided comprising a bolt arrangement located in the body 10 for a bolt thereof to extend and be positioned above the sleeve 38 in its lowered position in the first and second embodiments and below the sleeve 38 in its raised position in the third embodiment. The bolt may be operable pneumatically or by electrically operable solenoid arrangement.

Fig. 5 shows one embodiment of an assembly of

lifting attachments. The assembly comprises a horizontal planar frame 40 having anchorage means 42 proud of its upper surface and supporting therebelow a plurality of lifting attachments, each as described above according toany one of the embodiments. Movement of the moving means of all attachments are synchronised. The frame 40 is rectangular and six lifting attachments are supported therefrom in an arrangement of three pairs of two attachments. Each lifting attachment is connected to the frame 40 through a ram and cylinder arrangement 44 whereby a group of six spaced kegs can be lifted simultaneously by its respective lifting attachment and by retraction of the arrangments 44, the kegs 41 can be brought together as shown for consolidation as a group, the kegs 41 being put down on a surface similarly spaced as was originally picked up. The ram and cylinder arrangements 44 and the piston and cylinder arrangements 28 are connected up to a hydraulic fluid supply.

In a modification, the arrangements 28 or arrangements 28 and 44 may be pneumatically operable and connected up to a pressurised air supply. Alternatively, each arrangement 28 may be adapted to be mechanically operable using a pull cord or the like to lower the first mounting means and to raise it, or to have spring means to raise, or assist in raising, it.

Figs. 6 and 7 show another embodiment of an

assembly of lifting attachments. The assembly comprises a main body 52, similar to a body 10. The main body 52 has first and second means 54, 56 similar to first and second means 14, 16 and anchorage means 12. The body 52 is to carry four lifting attachments, and four lifting mechanisms are provided each comprising an arm 58 pivoted to the first mounting means 54 through link 62 and slidable in tubes 60 pivoted to the second mounting means 56. The outer ends of the arms 58 are suitable for pivotal connection thereto by a respective lifting attachment. Extended movement of the arms 58 allows the lifting attachments to be used to engage respective kegs, and retracted movement of the arms 58 with kegs attached brings the kegs together for consolidation and ease for handling.

Variations and other modifications can be made without departing from the scope of the invention described above and as claimed hereinafter.

CLAIMS

1. A lifting attachment comprising a columnar body having anchorage means at its top to be connected to a lifting apparatus, first and second mounting means being provided on the body in vertical spaced relation, one of said mounting means being adapted to be moved towards and away from the other of said mounting means which is stationery, and a series of gripping mechanisms each including a radiating arm pivotally attached at its inner end to a respective mounting on one of said mounting means, the arms being similarly shaped at their outer ends each as a gripping finger, each arm being in a pivotal relationship with a corresponding mounting on the other of said mounting means, movement of one of said mounting means relative to the other of said mounting means causing the arms to splay apart from the body into a gripping position, and means to move one of the mounting means.

2. A lifting attachment as claimed in Claim 1, wherein the body is a casing in which the moving means is housed.

3. A lifting attachment as claimed in Claim 1 or 2,

wherein the moving means is a piston and cylinder arrangement with the outer end of the piston arranged to extend and retract below the cylinder.

4. A lifting attachment as claimed in Claim 3, wherein a yoke bar is mounted to the outer end of the piston with its two opposite ends to extend out through respective diametrically opposed slots in the casing.

5. A lifting attachment as claimed in Claim 4, wherein the bar at each end carries a rod secured at its outer end to a sleeve peripherally around the casing.

6. A lifting attachment as claimed in Claim 5, wherein the sleeve has three equi-spaced radial mountings extending therefrom.

7. A lifting attachment as claimed in Claim 5 or 6, wherein also the sleeve forms the one of said mounting means which is the first mounting means to which the arms are pivotally attached.

8. A lifting attachment as claimed in Claim 7, wherein each arm is linked by a tie pivotally attached at its opposite ends to the arm and to the corresponding mounting on the other of said mounting means which is

the second mounting means.

9. A lifting attachment as claimed in Claim 8, wherein the second mounting means comprises three radial mountings spaced apart similarly to the mountings of the first mounting means.

10. A lifting attachment as claimed in Claim 6, wherein the arms are pivotally attached to the first mounting means and each arm is in sliding engagement in a tube pivoted to the second mounting means formed by a base plate.

11. A lifting attachment as claimed in Claim 6, wherein the one of said mounting means is the second mounting means to which the arms are pivotally attached and the corresponding ties are pivotally attached at their opposite ends to the arm and to corresponding mountings on the other of said mounting means which is the first mounting means.

12. A lifting attachment as claimed in any one of the preceding Claims, wherein the anchorage means is an apertured plate uprightly oriented on the top of the casing.

13. An assembly of lifting attachments comprising a substantially horizontal planar frame having anchorage means proud of its upper surface and supporting therebelow a plurality of lifting attachments as claimed in any one of the preceding Claims, movement of the moving means of all attachments being synchronised.

14. A lifting attachment as claimed in Claim 13, wherein the frame is rectangular and six lifting attachments are supported therefrom in an arrangement of three pairs of two attachments.

15. An assembly of lifting attachments comprising a main body having first and second mounting means for supporting four lifting attachments, each arm being pivoted to first mounting means and in sliding engagement in a tube pivoted to the second mounting means, the outer ends of the arms each being adapted for supporting a lifting attachment.

16. A lifting attachment substantially as hereinbefore described with reference to Figs. 1 and 2 of the accompanying drawings.

17. A lifting attachment substantially as hereinbefore described with reference to Fig. 3 of the accompanying drawings.

18. A lifting attachment substantially as hereinbefore described with reference to Fig. 4 of the accompanying drawings.

19. An assembly of lifting attachments substantially as hereinbefore described with reference to Fig. 5 of the accompanying drawings.

20. An assembly of lifting attachments substantially as hereinbefore described with reference to Figs. 6 and 7 of the accompanying drawings.

FIG.1.

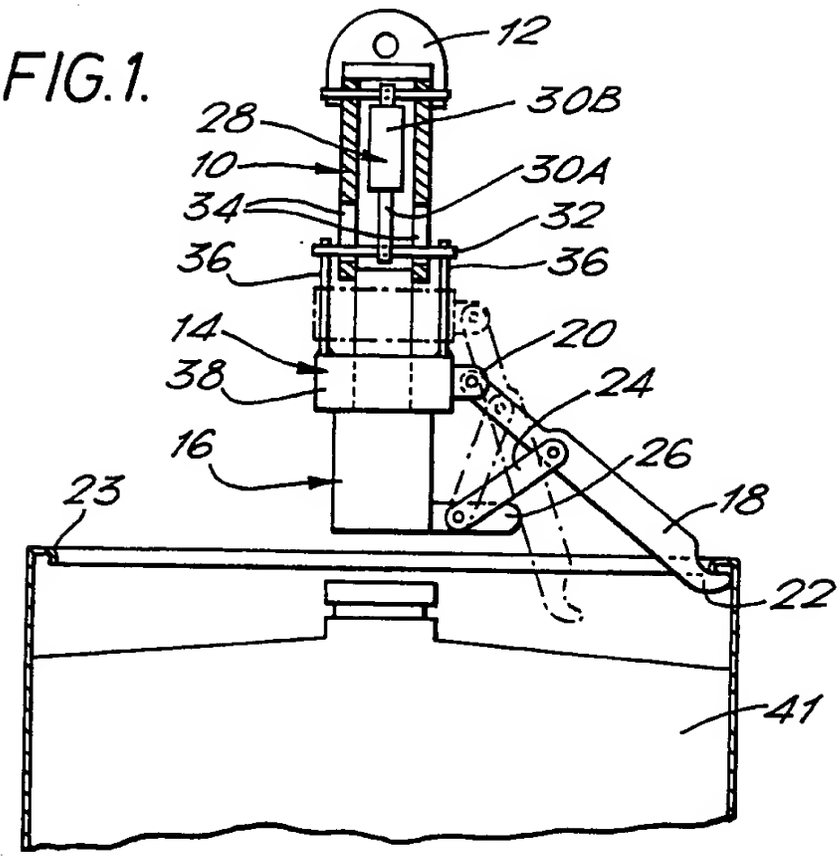
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FIG.2.

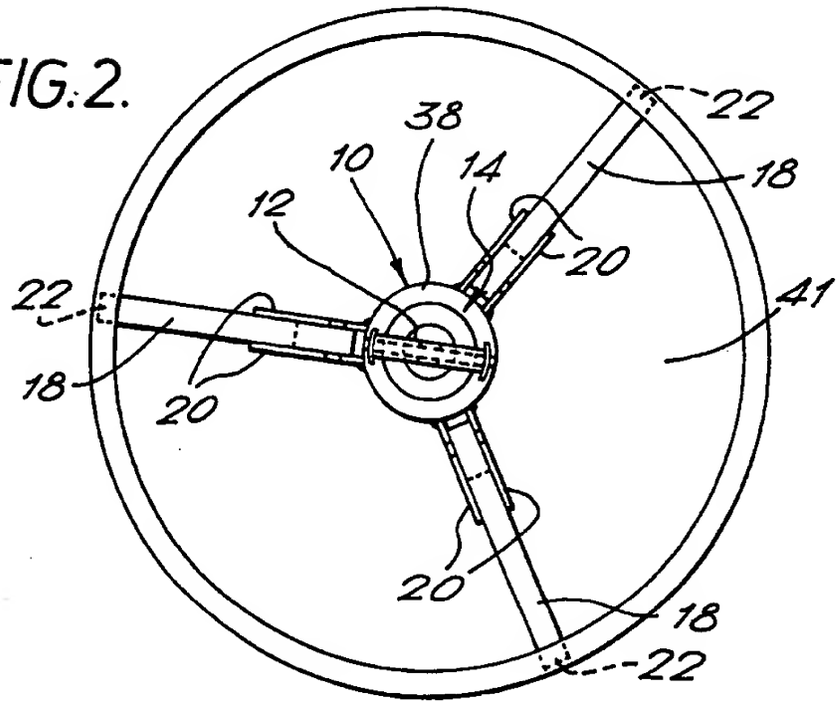
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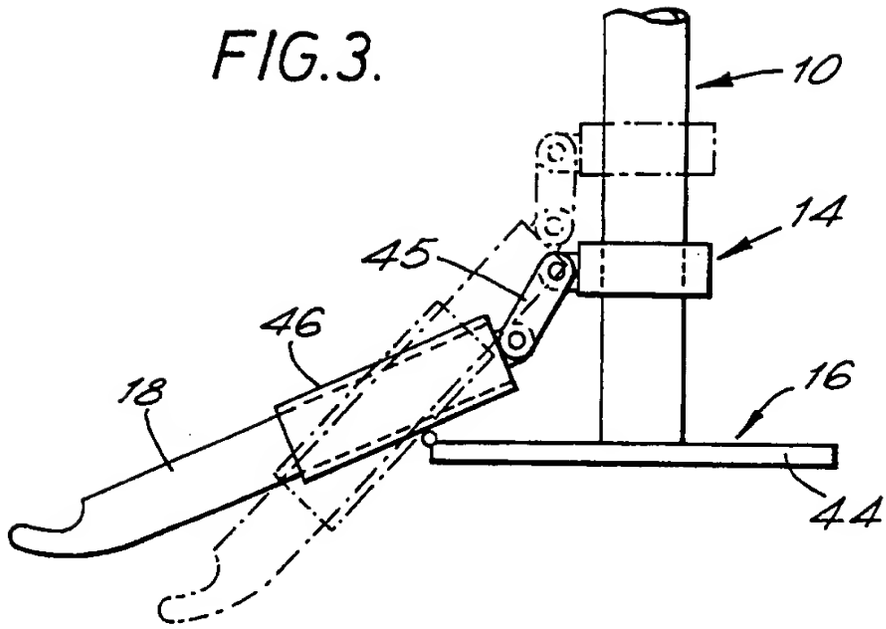
FIG.3.



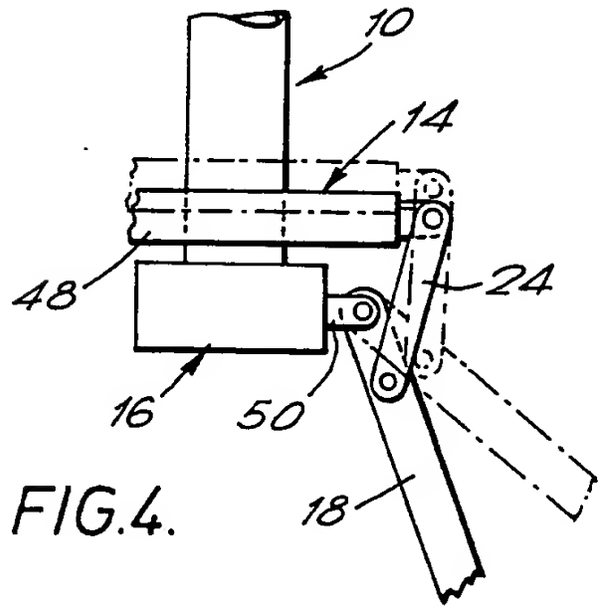
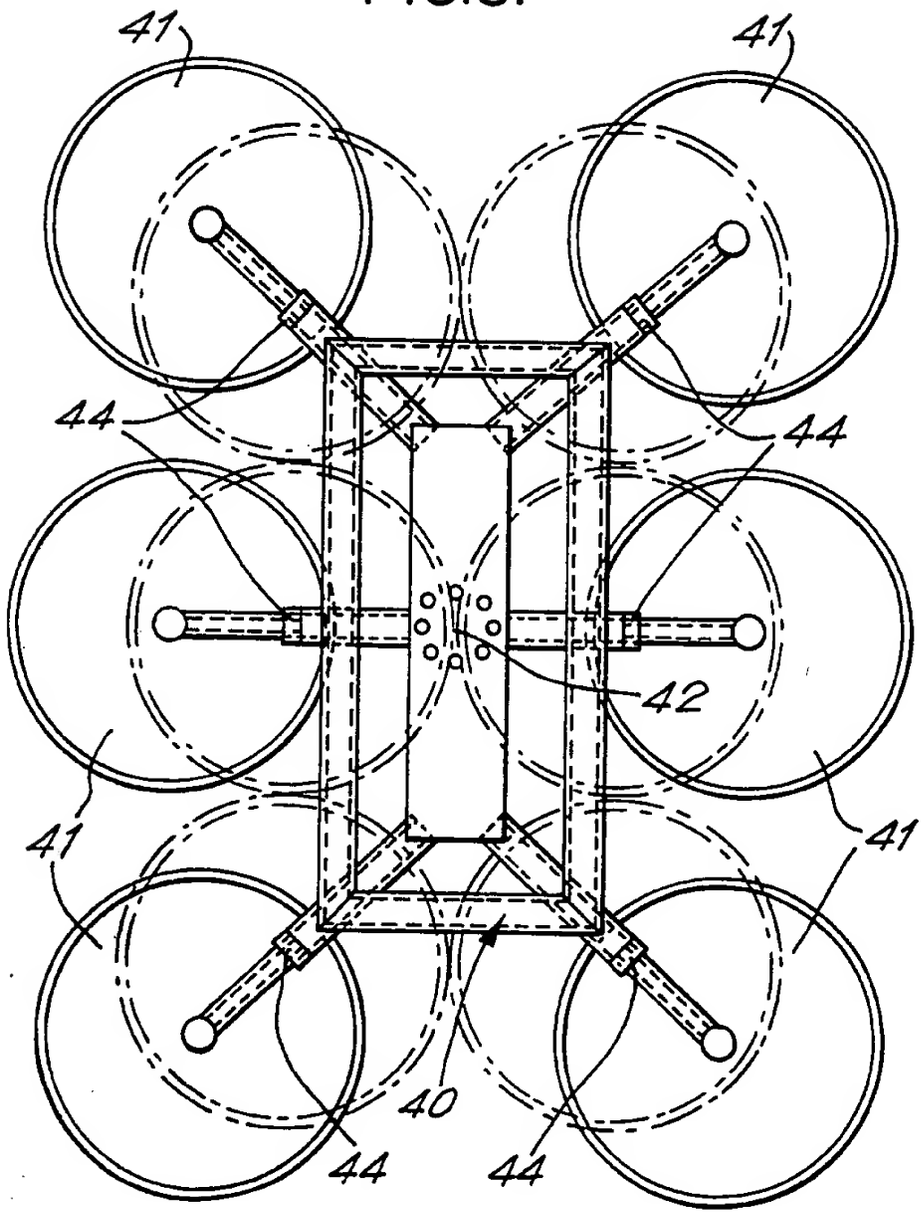


FIG.4.

FIG.5.



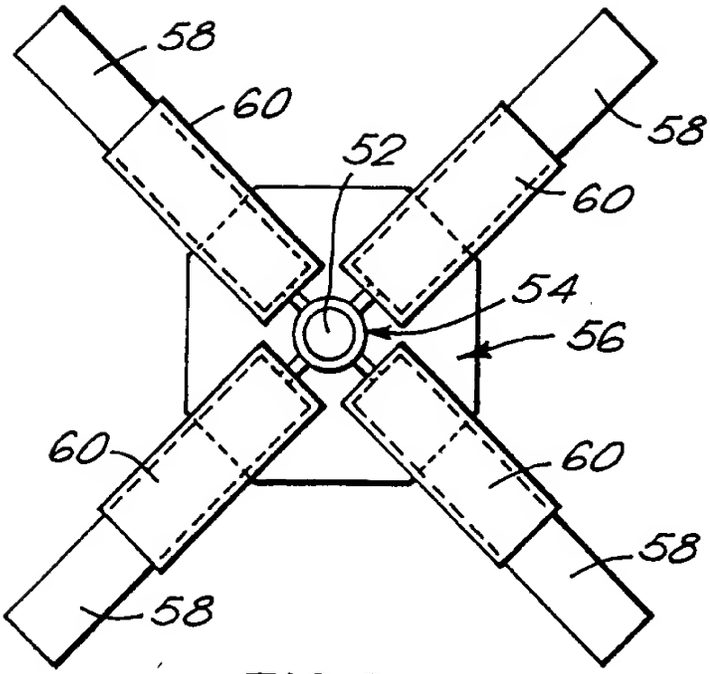


FIG.6.

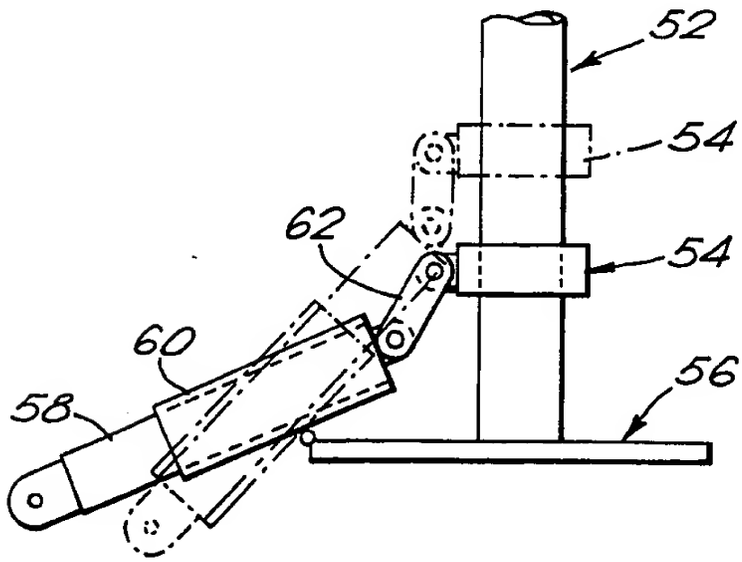


FIG.7.

INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 92/02013

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 B66C1/62; B66C1/54

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
Int.Cl. 5	B66C ; B66F

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category °	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No.[13]
X Y A	US,A,3 211 490 (GARDNER) 12 October 1965 see column 3, line 4 - column 6, line 20	1-4,12 13,14 6,9,11
Y	US,A,2 924 484 (TOLSMA) 9 February 1960 see the whole document	13,14
X A	DE,U,9 107 271 (CIBA-GEIGY) 25 July 1991 see the whole document	1 5-9,12
X A	US,A,4 095 834 (STRAUSS) 20 June 1978 see the whole document	1,12 6,9,11

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
22 JANUARY 1993	15. 02. 93
International Searching Authority	**Signature of Authorized Officer**
EUROPEAN PATENT OFFICE	VAN DEN BERGHE E.

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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

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A	see the whole document	6,9,10
X	DE,A,2 336 803 (SCHAEFER) 6 February 1975	1,3
A	see page 7, paragraph 2 - page 10, paragraph 2	6,9,11
X	BE,A,827 927 (ARTHUR GUINNESS SON & COMP.) 31 July 1975	1
A	see the whole document	3,6,9
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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. GB 9202013 SA 66375

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-3211490		None	
US-A-2924484		None	
DE-U-9107271	25-07-91	None	
US-A-4095834	20-06-78	None	
FR-A-1337489		GB-A- 1039904	
DE-A-2336803	06-02-75	None	
BE-A-827927	31-07-75	None	
US-A-3158275		None	
US-A-2732247		None	